

421.1 DESCRIPTION

This work consists of the removal of unstable material and rock, either in ledge or boulder formation, below the bedding grade of box, pipe, and plate pipe culverts, and the backfilling of undercut areas.

421.2 MATERIALS

- A. Backfill Material:** Material for backfilling the undercut areas of pipe and plate pipe culverts shall consist of stable material free of organic matter and rock. When specified in the plans or as required by the Engineer the backfill material shall conform to that used for backfilling undercut areas of box culverts.

Material for backfilling the undercut areas of box culverts shall conform to the following:

<u>Sieve</u>	<u>% Passing</u>
1 ½" (37.5 mm)	100
1" (25 mm)	95 - 100
No. 4 (4.75 mm)	0 - 75
No. 200 (75 m)	0 - 18

If undercut depth exceeds three feet below the bottom of the structure and stable material is not encountered, oversized rock material may be used up to the bottom of the undercut limits shown on the plans.

- B. Bedding Material for Precast Concrete Box Culverts:** Bedding material for precast concrete box culverts shall be sand or selected sandy soil conforming to the following:

<u>Sieve</u>	<u>% Passing</u>
3/8" (9.5 mm)	100
No. 200 (75 m)	0 - 10

- C. Extruded Insulation Board (Polystyrene):** Extruded insulation board (polystyrene) shall conform to AASHTO M230.

421.3 CONSTRUCTION REQUIREMENTS

- A. General:** If the Engineer determines field conditions warrant change, the limits of the undercutting may be increased, decreased, or eliminated. The width of undercutting for pipe culverts will be the outside diameter of the pipe plus four feet (1.2 m) or the outside span of arch pipe plus four feet (1.2 m). Undercut material shall be disposed of at locations acceptable to the Engineer.

Backfill shall be compacted in accordance with Section 120.3.B.3.a, Specified Density Method. Backfill shall be compacted to 95% of Maximum Dry Density in horizontal layers not to exceed six inches (150 mm) loose depth. If the backfill material does not contain enough fines to allow for conventional density testing (SD 105 or SD 106), the natural material will be compacted in

the manner described in Section 120.3.B.3.a for A-2-4(0) and A-3 soils. Compaction of A-2-4(0) and A-3 soils shall provide a firm, unyielding surface satisfactory to the Engineer.

B. Box Culvert: Undercut dimensions shall be to the dimensions shown on the plans, unless otherwise directed by the Engineer.

C. Pipe Culvert: A moisture/density test is required in the foundation soil under all rural mainline cross pipes prior to installation. The foundation soil density will be in accordance with the Specified Density Method. The foundation soil will be improved by one of the following methods, as directed by the Engineer.

1. Scarifying the foundation soil to a depth of 6 to 8 inches (150 to 200 mm) and recompacting.
2. Undercutting the foundation soil and replacing or recompacting.

Under this item of work, the removal of unstable material and rock, either ledge or boulder formation, below the bedding grade of pipe culverts and the backfilling of undercut areas shall be performed.

Pipe culverts placed on embankment soil (i.e. in the fill and not on natural ground) will not require pre-installation testing of the foundation soil provided that the fill area has been included in normal embankment testing zones.

The Engineer may direct undercutting of pipe not included in the plans. The limits of undercutting may be increased, decreased, or eliminated if the Engineer determines field conditions warrant a change as noted in this Section. This includes the quantities listed in the Table of Pipe Culvert Undercut.

421.4 METHOD OF MEASUREMENT

A. Box Culvert Undercut: Undercutting box culverts will be measured by the cubic yard (cubic meter). The upper limit will be the bedding grade of the box culvert. The width, length and lower limits will be as specified on the plans unless otherwise directed by the Engineer.

B. Pipe and Plate Pipe Culvert Undercut: Undercutting pipe and plate pipe culverts will be measured by the cubic yard (cubic meter). The upper limit will be the lower face of the pipe, except the upper limit for pipe culverts to be installed on a Class B bedding will be one foot (300 mm) below the lower face of the pipe. The width, length and lower limits will be as specified.

421.5 BASIS OF PAYMENT

A. Box Culvert Undercut: This work will be paid for at the contract unit price per cubic yard (cubic meter), under the item box culvert undercut. The basis of payment will be for plans quantities unless additional undercutting is directed by the Engineer. When additional undercutting is required, the adjusted quantity of undercutting will be paid for at the contract unit price regardless of the backfill material used. Payment will be full compensation for equipment,

labor, tools and incidentals required for undercutting and for furnishing, placing, watering and compacting backfill material, including bedding material when specified on the plans.

- B. Pipe and Plate Pipe Culvert Undercut:** This work will be paid for at the contract unit price per cubic yard (cubic meter), under the item pipe culvert undercut. All costs for undercutting pipe culverts including equipment, labor, tools, and materials for furnishing, placing, watering, and compacting backfill in place of excavated material shall be incidental to the contract unit price for pipe culvert undercut. The quantities listed in the Table of Pipe Culvert Undercut are based on the undercut width specified above, and a depth of one foot for all pipes 36 inches in diameter and greater. When undercutting culverts is required at other locations or to a different depth than specified, the adjusted quantity of undercutting will be paid for at the contract unit price. When a bid item is not provided, undercutting pipe and plate pipe culverts will be paid for at the rate specified in the price schedule for miscellaneous items.

All costs for scarifying the foundation soil including equipment, labor, watering, and compacting the scarified soil shall be incidental to the contract unit price per foot for pipe culvert installation.

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